2.009 Final Presentation

December 8, 2004

Yellow Team

Overview

Background

The Kinkajuice

Alpha Prototype

Business Model

Questions

Background

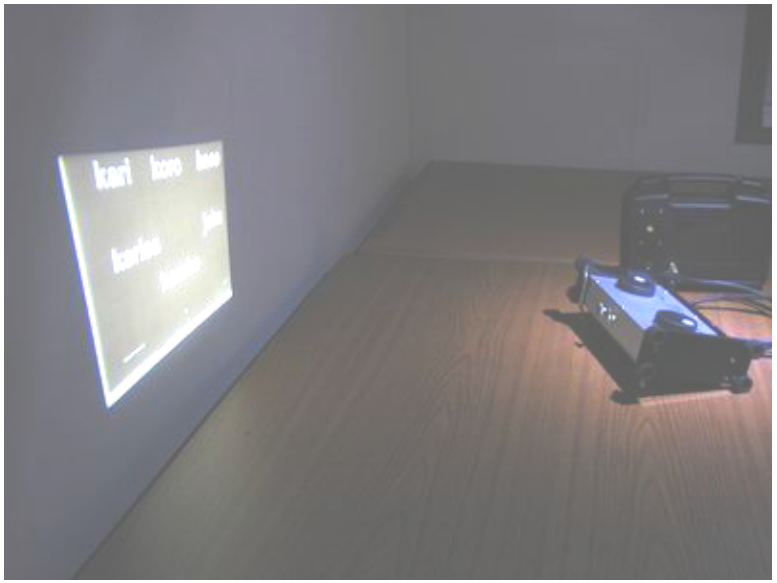
Context

Mali:
14 million people
10,000+ villages
30% literacy rate

Kinkajou:
Microfilm projector for night-time adult literacy classes.
One projector used per school.

Background

Kinkajou Charger Needs



$50 maximum cost

10:1 use to charge ratio

Low maintenance

Simple interface

Portable

Matches lifespan of Kinkajou

1 charge cycle lasts for two classes

The KinkaJuice

Product Specifications

~$45 manufacture cost

10:1 use to charge ratio

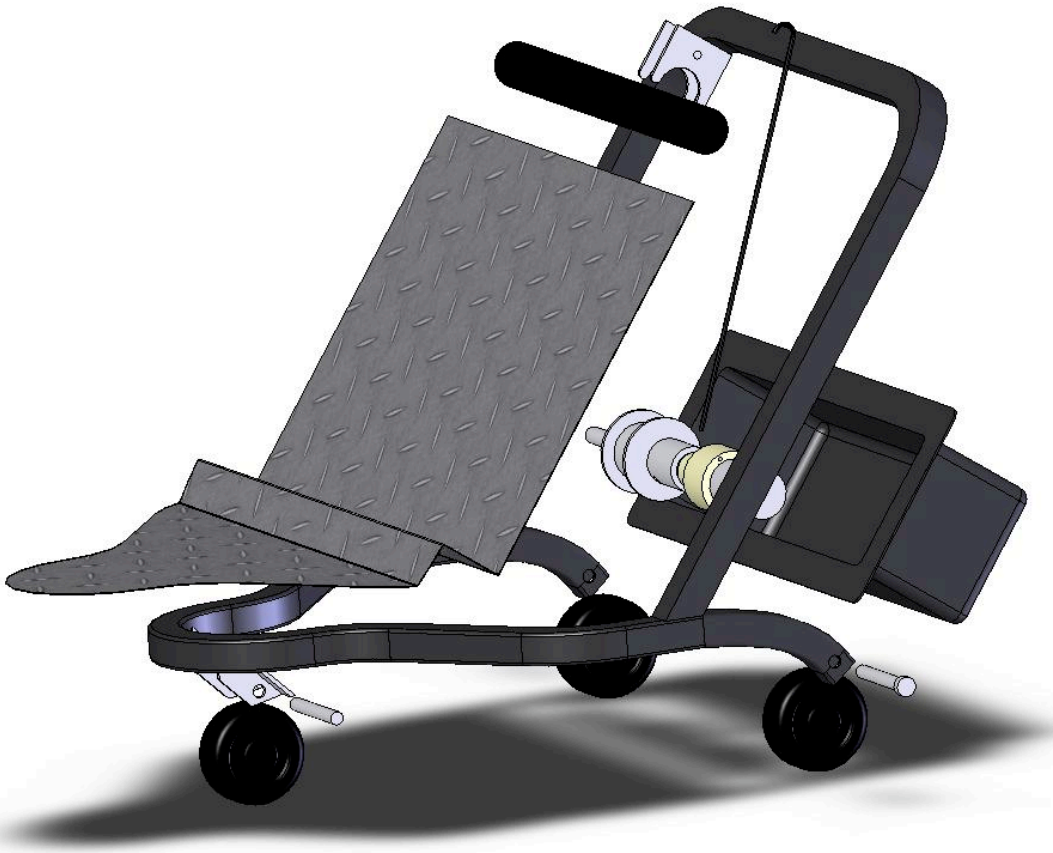
100-hr life cycle for motor

No user manual needed

10 kg

“Plug-in” outlet specific to Kinkajou

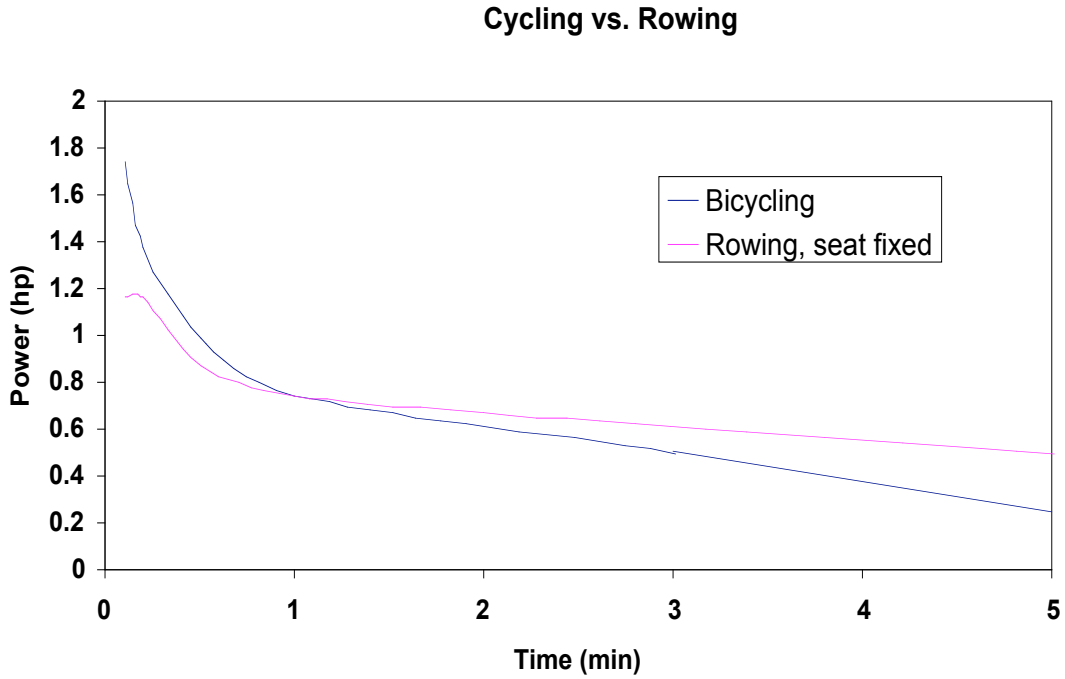
Alpha Prototype



Alpha Prototype

Bicycling versus Rowing

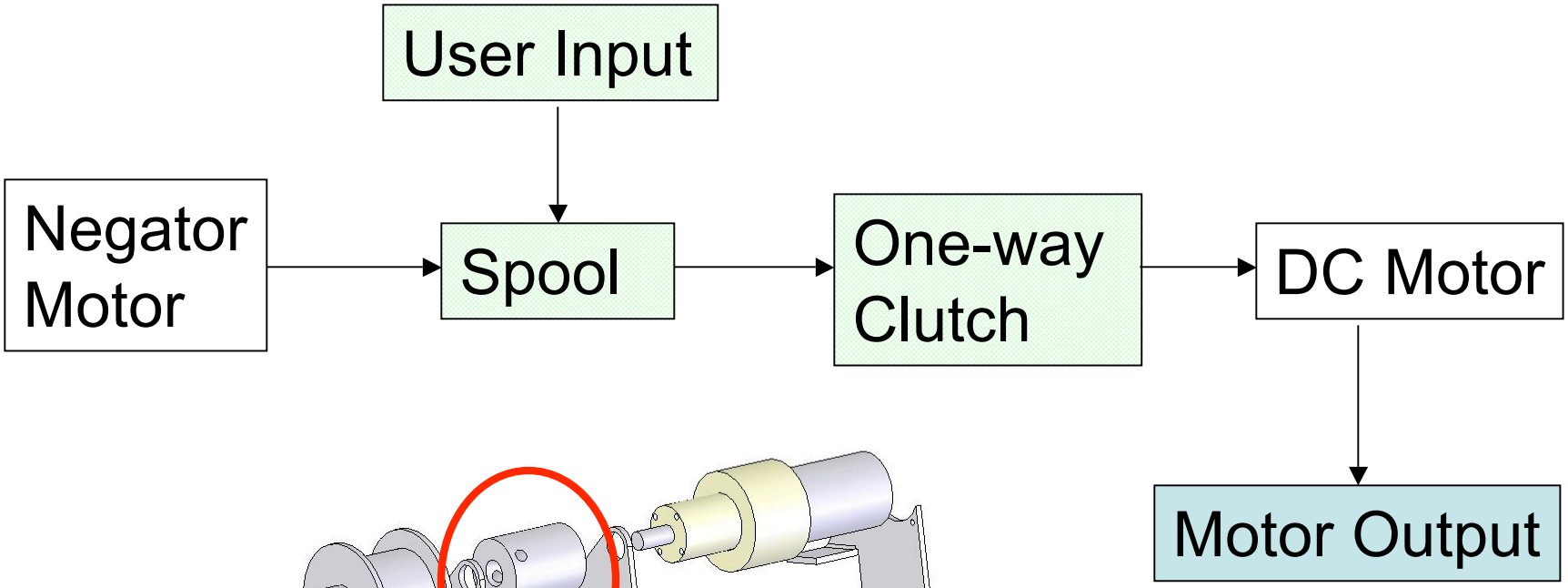
Larger range of muscle groups = More power output



Data from *Bicycling Science*, David Gordon Wilson, 1982.

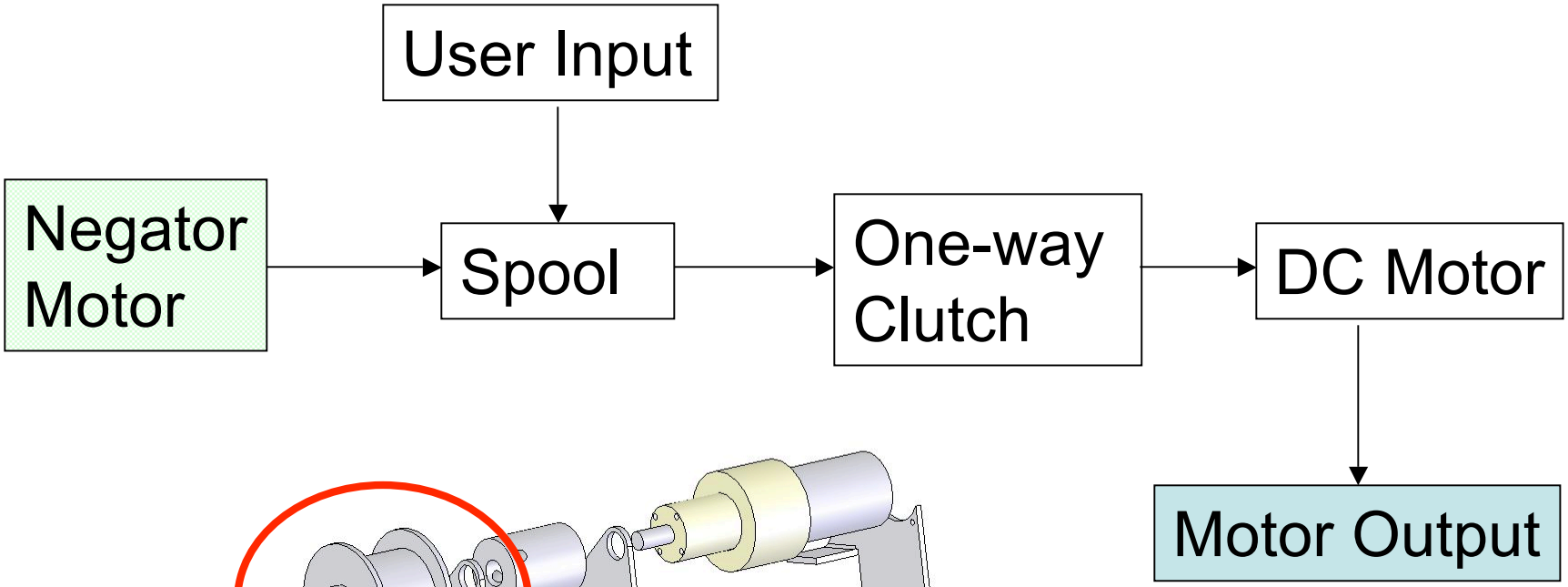
Alpha Prototype

Mechanics



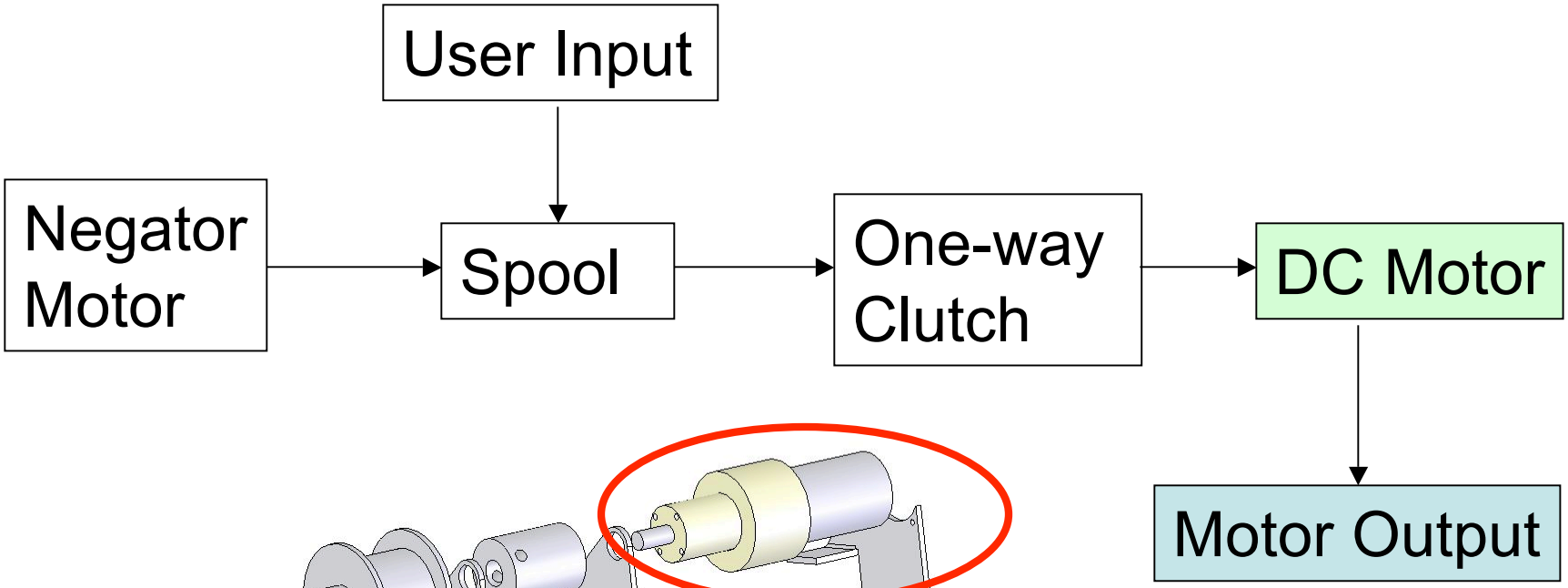
Alpha Prototype

Mechanics



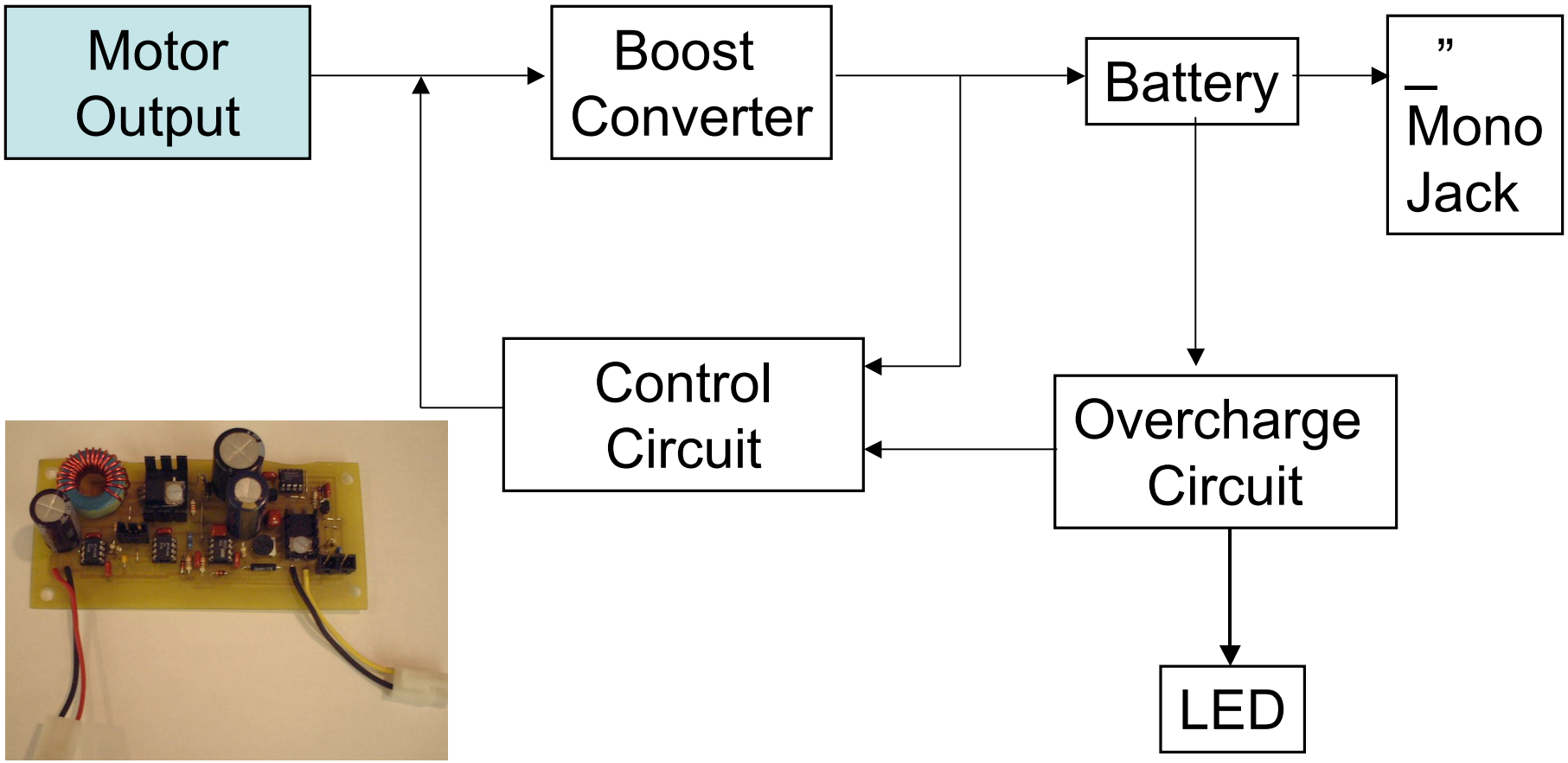
Alpha Prototype

Mechanics



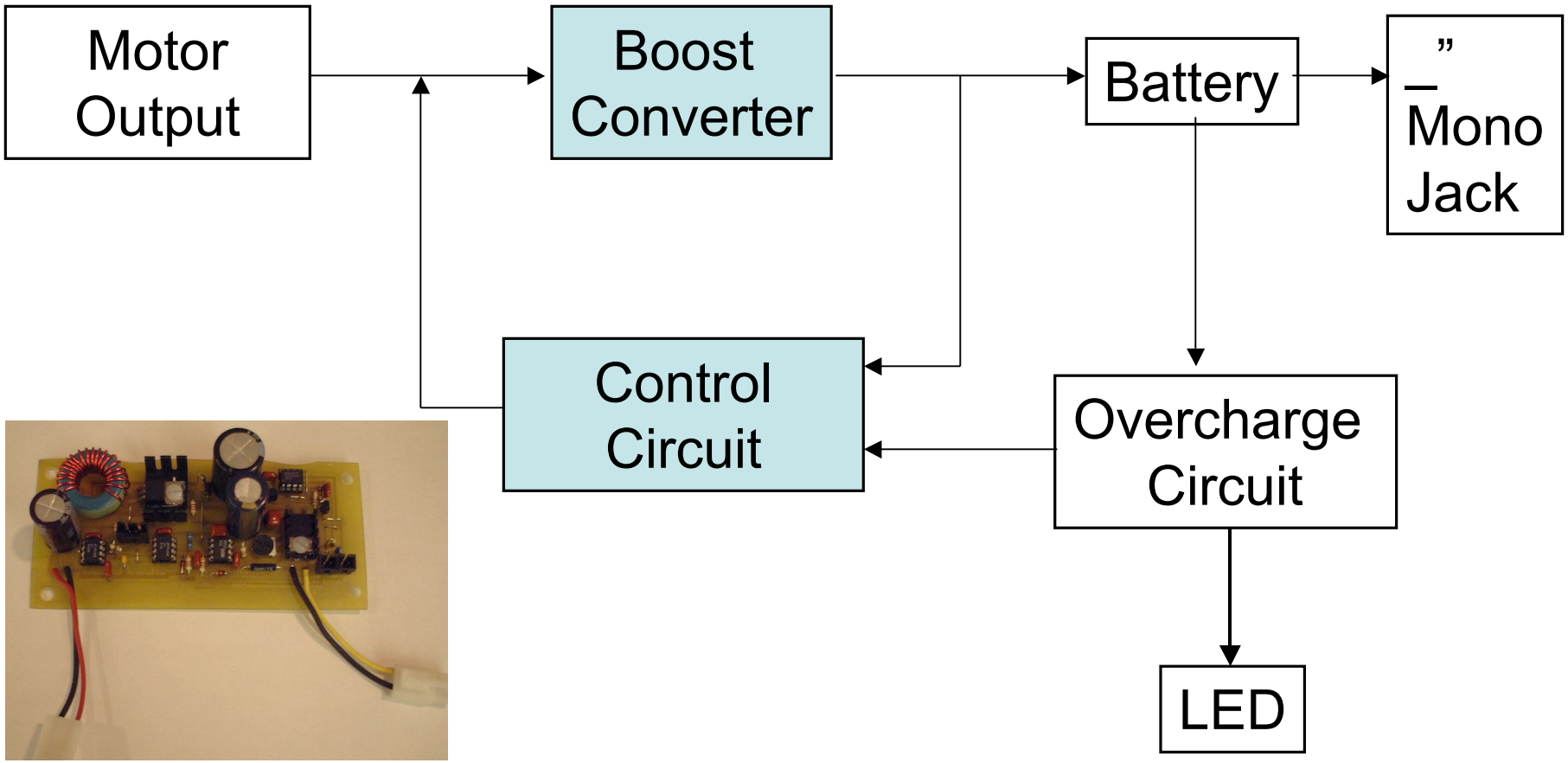
Alpha Prototype

Electronics



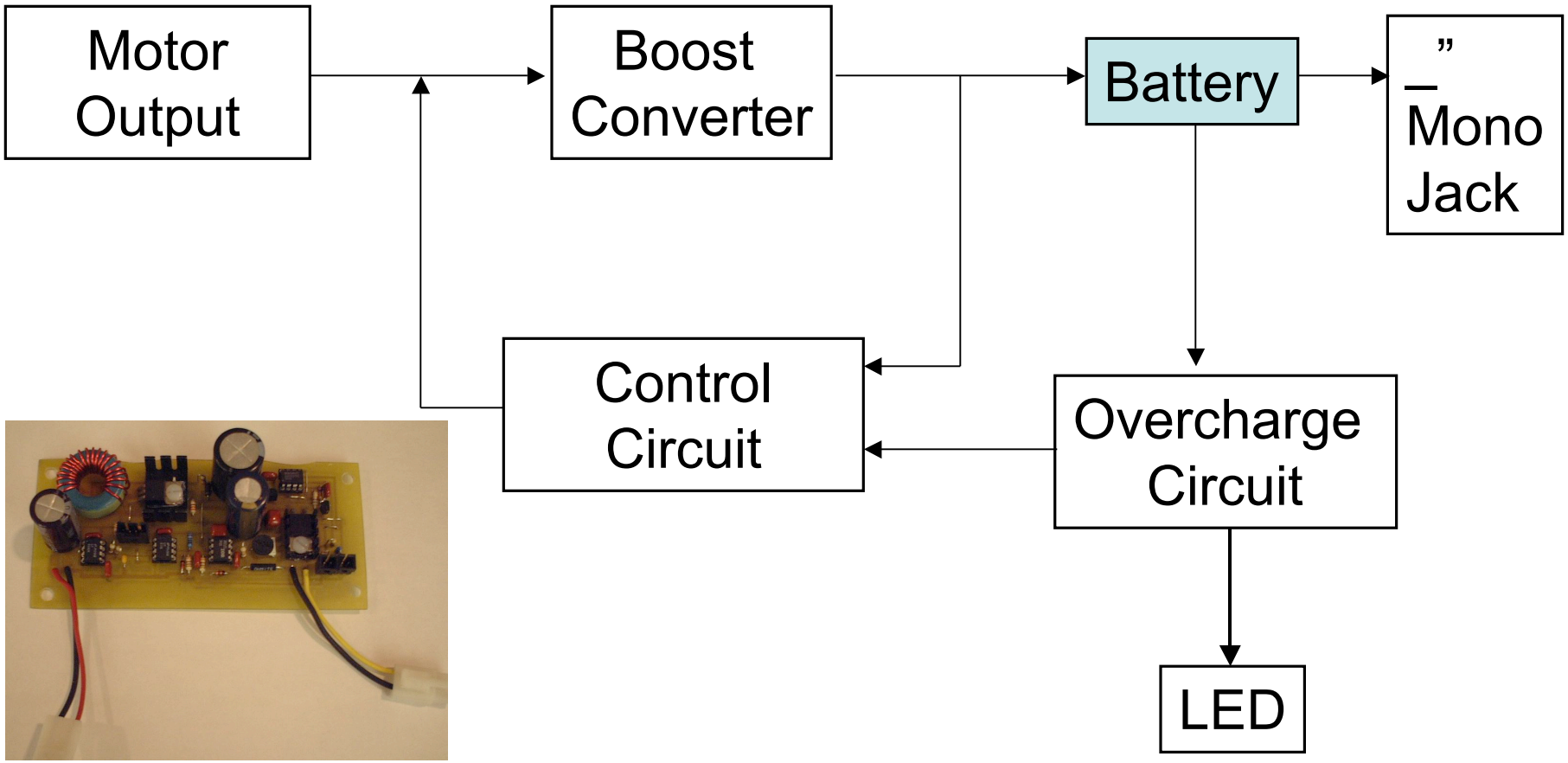
Alpha Prototype

Electronics



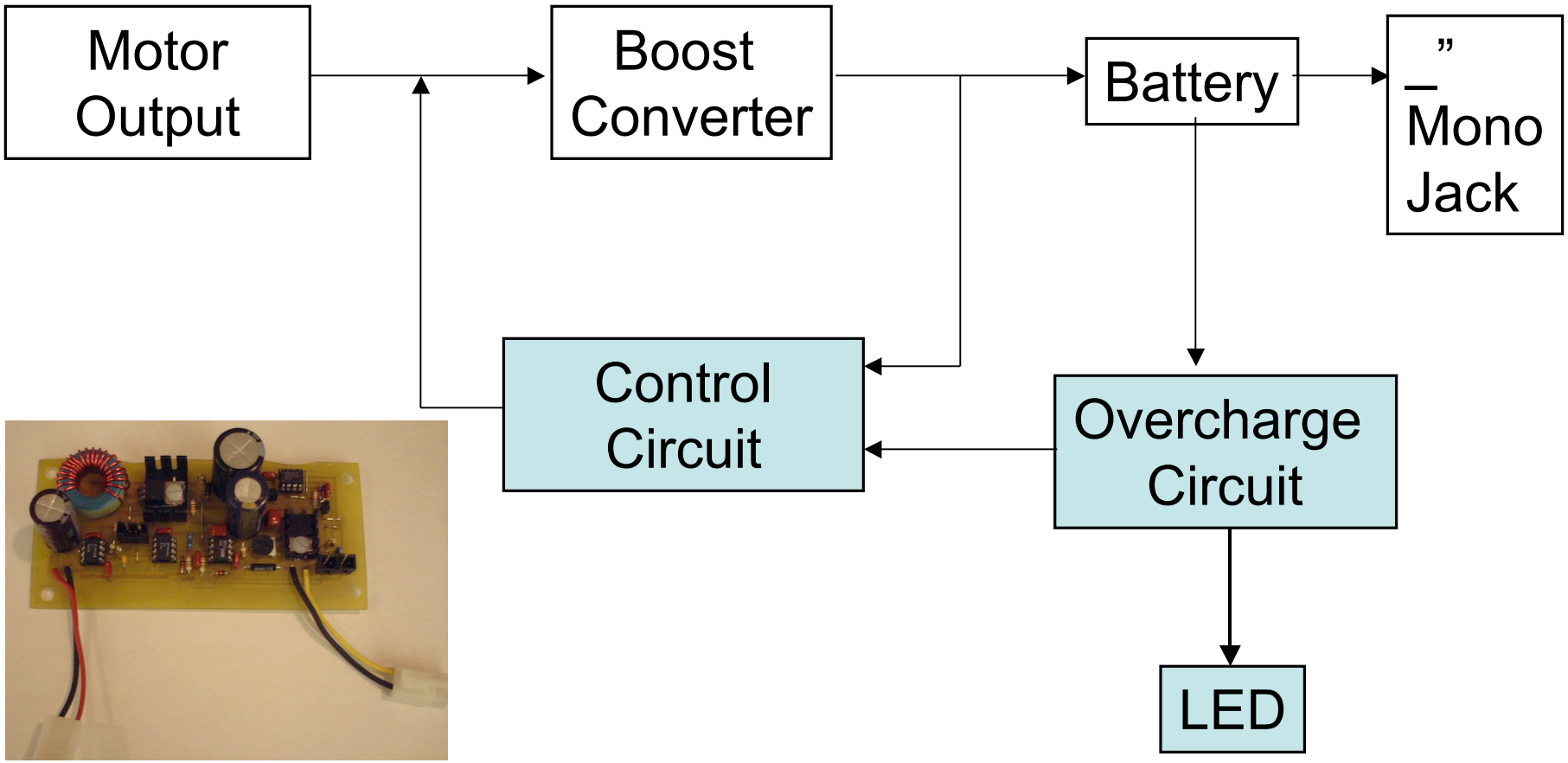
Alpha Prototype

Electronics



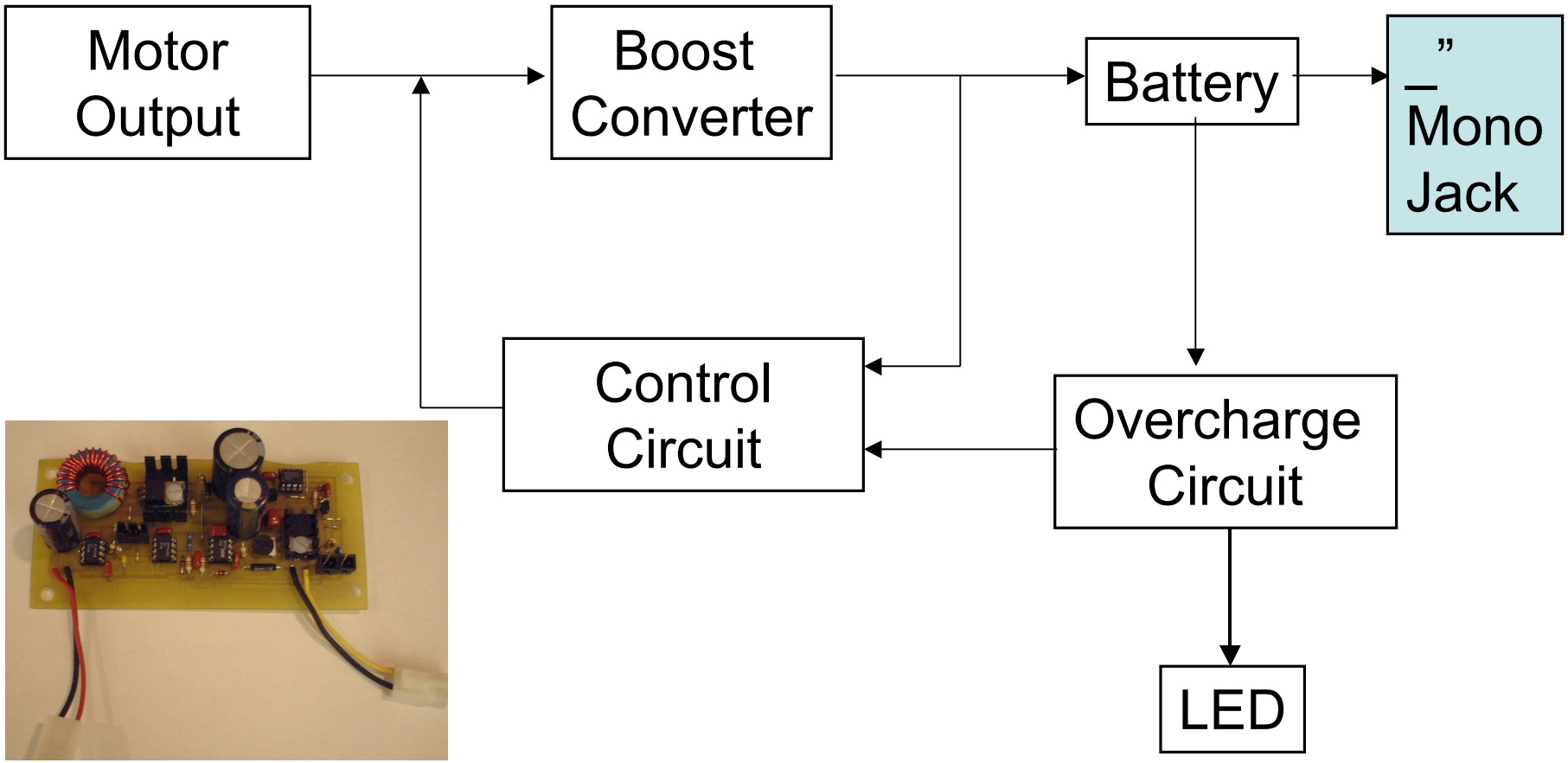
Alpha Prototype

Electronics



Alpha Prototype

Electronics



Alpha Prototype

Frame & Materials

Box Extrusion

Plate

Wheels

Handle

Ergonomics

Details of design

Rowing machines

User feedback

- On-campus
- Mali

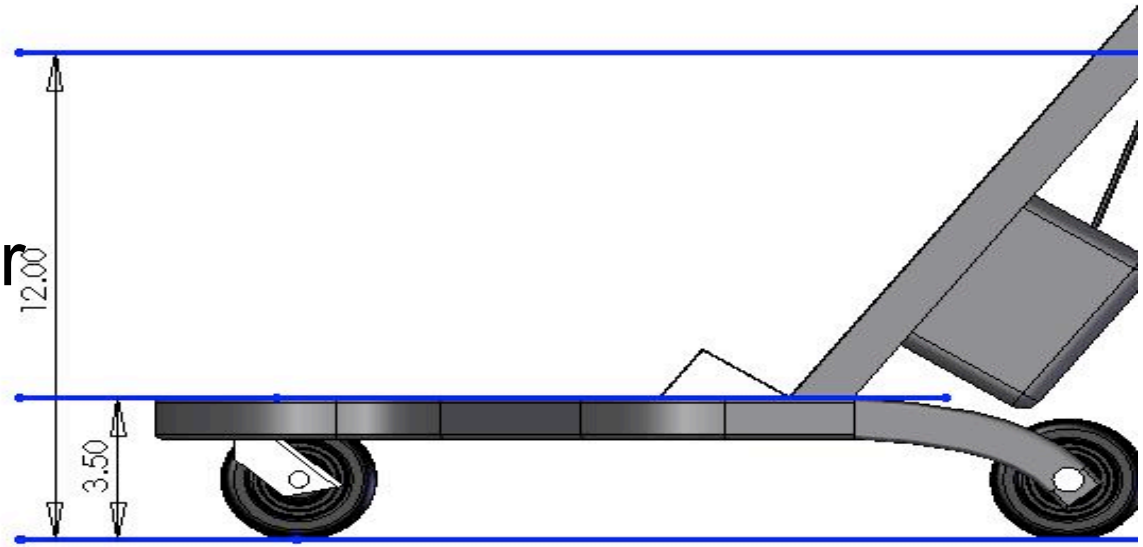
mali

Dimensions

Critical Heights

Optimal distance between feet and seat: 9”

Wheels: 3” diameter



Dimensions

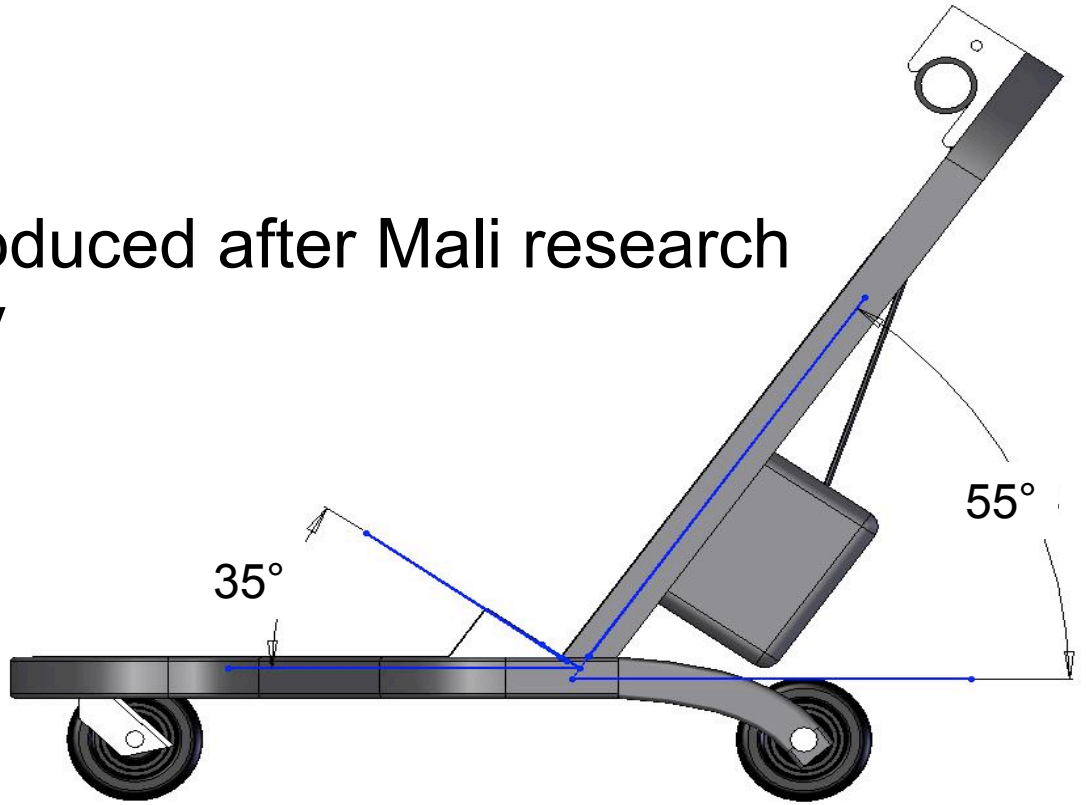
Critical Angles

Foot plate angle: 55°

Foot wedge angle: 35°

Foot wedge introduced after Mali research

Increases user stability



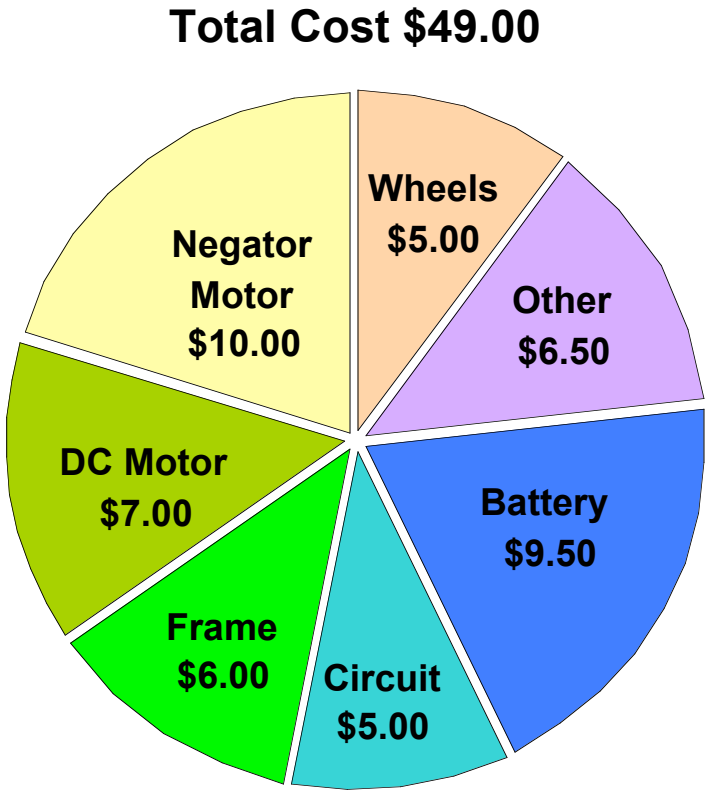
Business Model

The Competition

Product	Rated Output [W]	Charge time for 2 hour class [min]	Use:Charge	Approx.Cost
Kinkajuice	60	12	10 to 1	$45 +/-$10
Unisolar US-11 panel	10	72	1.7 to 1	$130
Freeplay hand crank	25	29	4 to 1	$50 +batt
Pedal-a-Watt	125	6	20 to 1	$150+bike+batt

Business Model

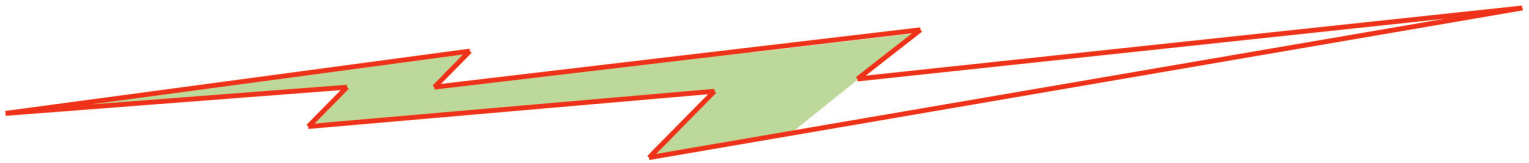
Cost Analysis



*Funding solicited from NGO's and non-profit organizations

Deployment

Year	Phase	Units Produced	Unit Cost
2005	Field Testing	45	$50
2006	Kinkajou Partnership	5,000	$45
2007	Expansion of Kinkajou	10,000 – 15,000	$40
2008	New Markets	15,000 – 25,000	$35



Acknowledgements

Thank You!

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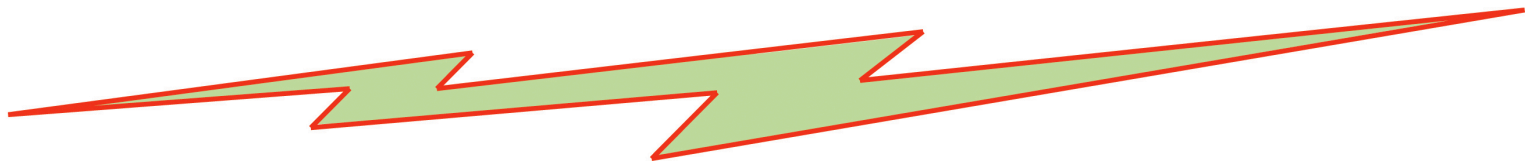
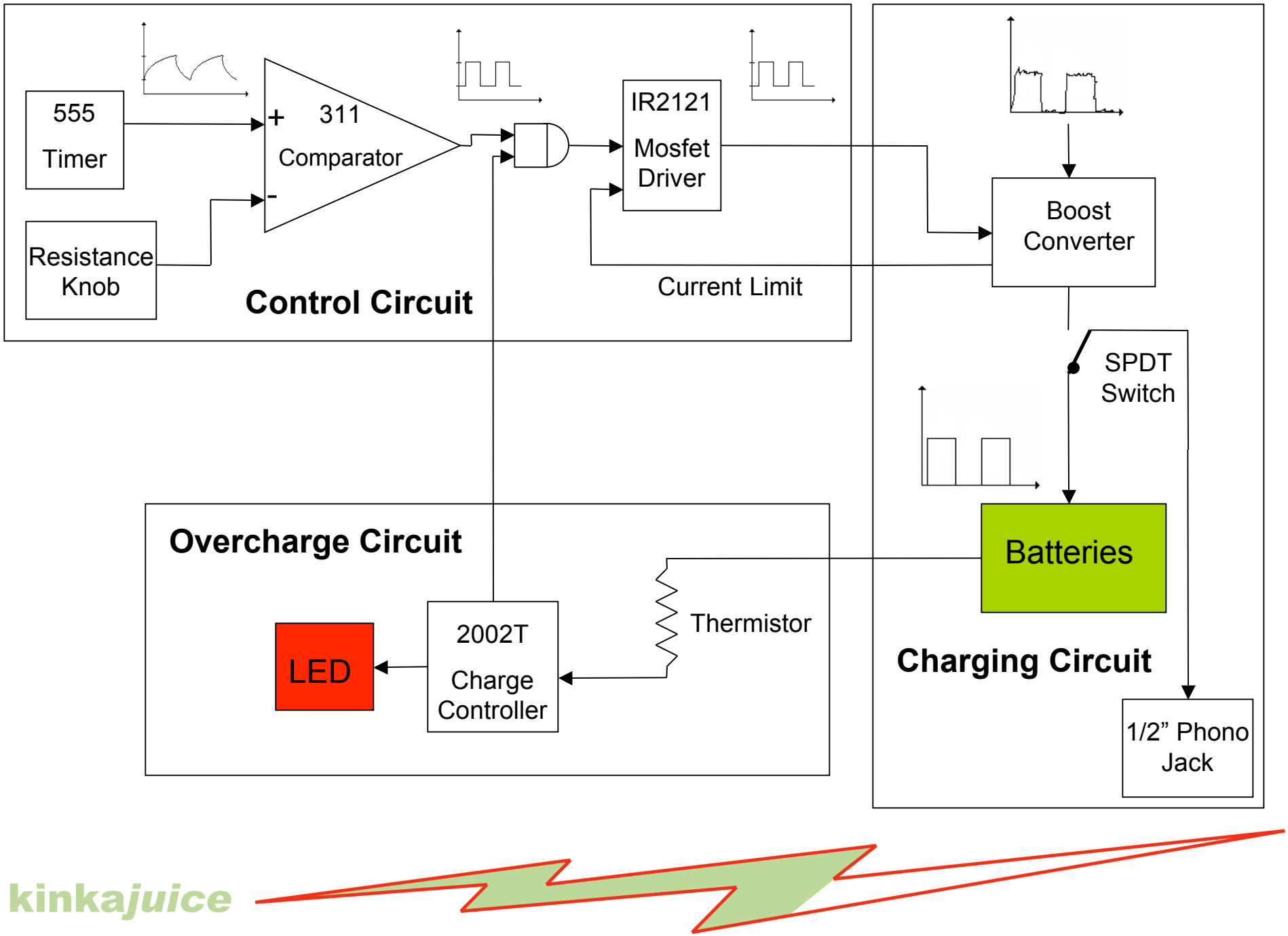
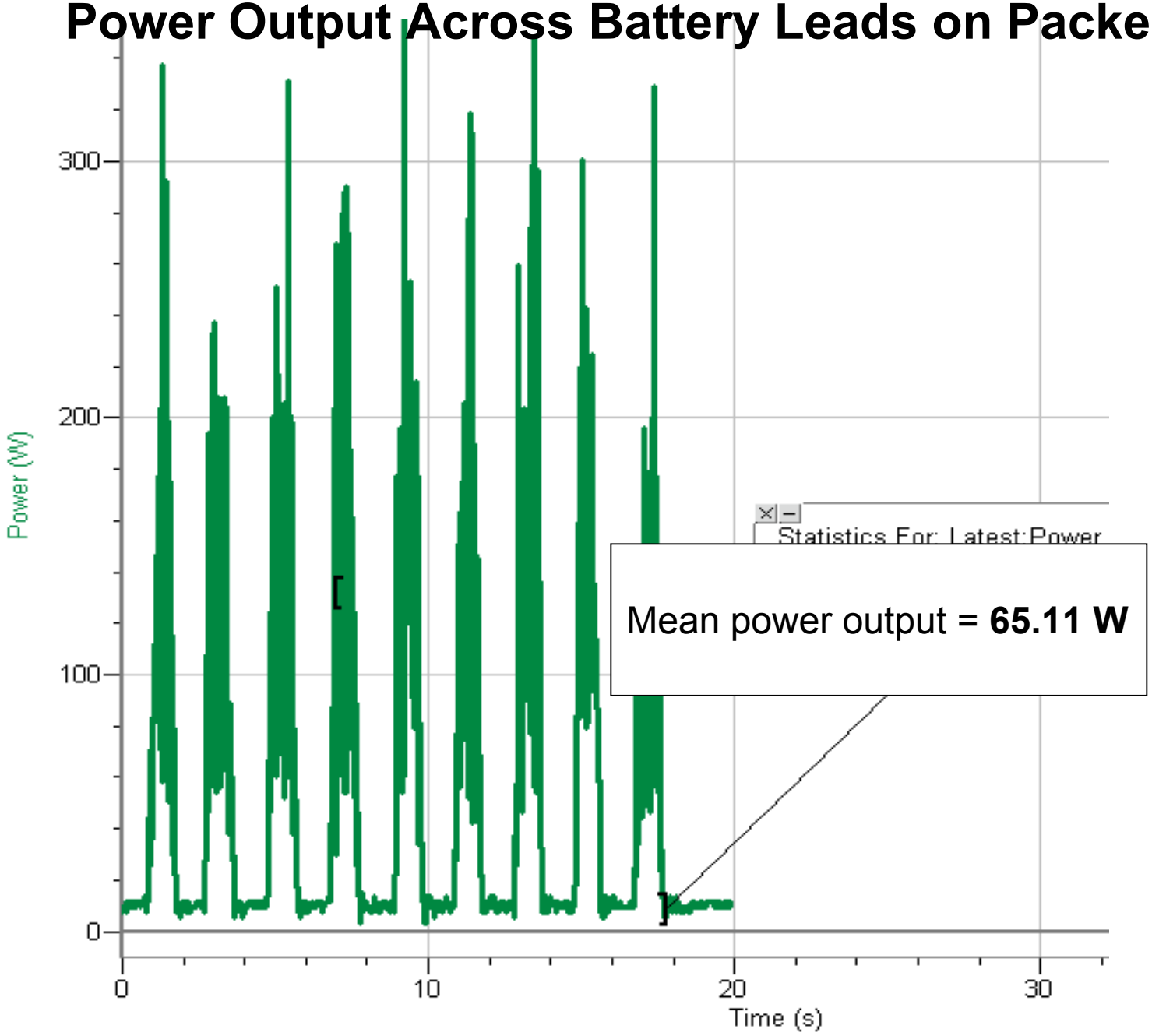
Pappalardo Staff
Tim Prestero & Design That Matters
The MIT Public Service Center
ME Department Head Rohan Abeyaratne

Questions?

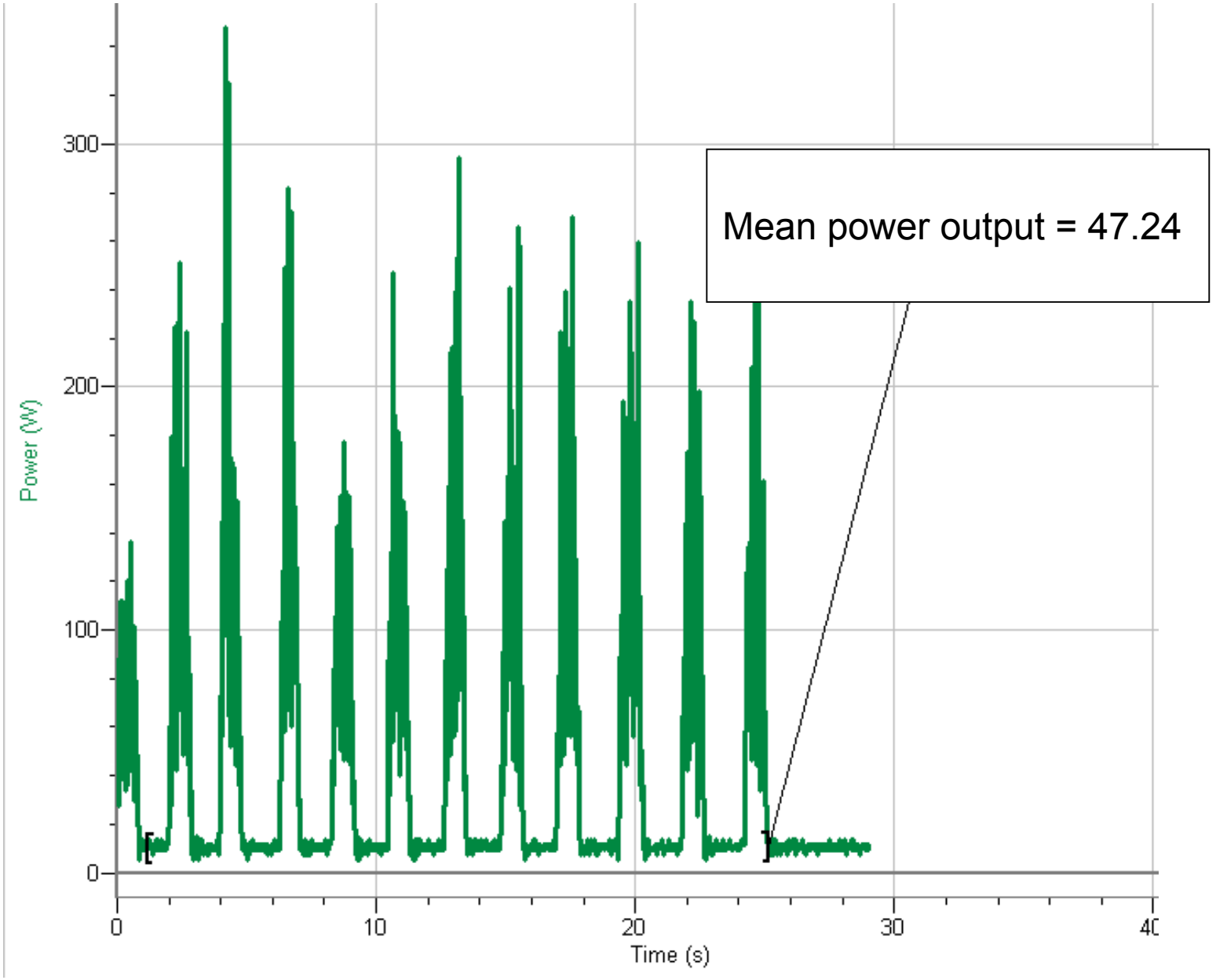



555
Timer
311
Comparator
+
-
Resistance
Knob
Control Circuit
IR2121
Mosfet
Driver
Current Limit
Boost
Converter
SPDT
Switch
Batteries
Overcharge Circuit
LED
2002T
Charge
Controller
Thermistor
Charging Circuit
1/2” Phono
Jack
kinkajuice

Power Output Across Battery Leads on Packed Dirt



Power Output Across Battery Leads on Packed Dirt



The Kinkajuice

Our Solution

Customer Needs	Kinkajuice Specifications
$50 maximum cost	$49 manufacture cost
Low maintenance	100-hr use to motor replacement after 100-hr
10:1 use to charge ratio	10:1 use to charge ratio
Portable	10 kg
Lifespan compatibility	100 hours of use
Simple interface	“plug-in” outlet